Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-18. (Canceled)

19. (Currently amended) A gas-agitated multiphase reactor ~~with a low degree of backmixing~~ ~~suitable~~ for hydrocarbon synthesis, comprising:

a reaction vessel characterized by an internal diameter Dr of greater than or equal to 0.6 m,~~;~~

wherein said reaction vessel ~~configured to~~is capable of having a liquid disposed therein;

~~a gas distributor disposed near the bottom of the reaction vessel, said gas distributor being suitable for dispersing a gas phase through the liquid, and creating a gas flow and a liquid flow; and~~

a plurality of internal structures disposed within said reaction vessel,

wherein the plurality of internal structures is arranged so as to create a plurality of reaction zones within the reaction vessel, and wherein the plurality of internal structures has a characteristic size d, and further wherein d is from about 2.5 cm to about 13 cm;

wherein each reaction zone is in fluid communication with at least one adjacent reaction zone, and

wherein the plurality of internal structures is configured such that each of said reaction zones has a characteristic size Ds that is less than the reaction vessel internal diameter Dr; and

a gas distributor disposed near the bottom of the reaction vessel, said gas distributor being suitable for passing a gas phase through the liquid into the plurality of reaction zones, and creating a gas flow and a liquid flow in each of the reaction flow zones.

20. (Original) The reactor according to claim 19 wherein the plurality of reaction zones is created by patterned arrangements of internal structures.

21. (Previously presented) The reactor according to claim 20 wherein the patterned arrangements create a cross-sectional shape of the reaction zones selected from the group consisting of circular, rectangular, diamond, concentric circular, and any combination thereof.

22. (Original) The reactor according to claim 20 wherein the structures are arranged in various patterns to create repeating zones.

23. (Original) The reactor according to claim 19 wherein Dr is in the range of 0.6 m to 10 m.

24. (Original) The reactor according to claim 23 wherein Dr is greater than or equal to about 1.2 meters.

25. (Original) The reactor according to claim 24 wherein Dr is greater than or equal to about 1.8 meters.

26. (Original) The reactor according to claim 19 wherein Dr is greater than or equal to 10 m.

27. (Original) The reactor according to claim 19 wherein Ds is between about 0.15 meter and about 0.6 meter.

28. (Original) The reactor according to claim 19 wherein Ds is between about 0.15 meter and about 0.5 meter.

29. (Original) The reactor according to claim 19 wherein the reaction vessel has a height to diameter ratio between about 0.5 and about 20.

30. (Original) The reactor according to claim 19 wherein each of the reaction zones has a height to diameter ratio between about 7 and about 180.

31. (Original) The reactor according to claim 19 wherein each of the plurality of internal structures has a characteristic size d, and wherein d is smaller than Ds.

32. (Original) The reactor according to claim 19 wherein each of the plurality of internal structures has a characteristic size d, and the spacing Di between centers of adjacent internal structures is between about 1.1d and about 4d.

33. (Previously presented) The reactor according to claim 32 wherein Di is between about 1.2d and about 3d.

34-35. (Canceled)

36 (Currently amended) The reactor according to claim ~~35~~ 19 wherein d is from about 4 cm to about 10 cm (about 1.6-4 inches).

37. (Original) The reactor according to claim 19 wherein the plurality of internal structures comprises components having walls that are permeable to gas or liquid.

38. (Previously presented) The reactor according to claim 37 wherein the reaction vessel further includes a solid phase and said solid phase is retained outside said walls during operation.

39. (Previously presented) The reactor according to claim 37 wherein the reaction vessel further includes a solid phase and said solid phase is retained inside said walls during operation.

40. (Original) The reactor according to claim 19 wherein the internal structures are parallel so as to create repeating parallel reaction zones.

41. (Currently amended) The reactor according to claim 19 wherein the internal structures ~~includes~~ include tubes or rods.

42. (Original) The reactor according to claim 19 wherein the internal structures comprise components having cross-sectional shapes selected from the group consisting of circular, trilobe, oval, rectangular, square, and irregular shapes.

43 (Original) The reactor according to claim 19 wherein the internal structures include heating or cooling tubes.

44. (Original) The reactor according to claim 19 wherein the multiphase reactor further comprises one or more tubular structures wherein the tubular structures are permeable to gas and liquid.

45. (Currently amended) The reactor according to 19 wherein the gas-agitated multiphase reactor ~~is a hydrocarbon synthesis reactor~~further comprises a liquid phase, said liquid phase comprising hydrocarbon liquid synthesis products.

46. (Currently amended) The reactor according to 19 wherein the gas-agitated multiphase reactor ~~is a slurry bubble column~~further comprises a slurry.

47. (Canceled)

48. (Currently amended) A reactor comprising:

a large diameter reaction vessel capable of having liquid contained therein, wherein the large diameter reaction vessel has a diameter of greater than or equal to 0.6 m;

~~a means for introducing gas into the reaction vessel; and~~

a means for reducing the liquid axial dispersion coefficient and backmixing within the reaction vessel, said means for reducing comprising a non-uniform distribution of internal structures arranged in such a manner to create a plurality of discrete zones within the reaction vessel, wherein the internal structures comprise an area of about 10% to about 25% of the cross-sectional area of the reaction vessel; and

a means for introducing gas into the plurality of said discrete zones within the reaction vessel.

49-51. (Canceled)

52. (Currently amended) The reactor according to claim ~~49~~ 48 wherein the internal structures comprise a completely non-uniform configuration at 5% to 20% of the total cross-sectional area of the reaction vessel.

53. (Currently amended) The reactor according to claim ~~49~~ 48 wherein the internal structures are arranged in various patterns to create reaction zones within the reaction vessel, and further wherein each reaction zone is in fluid communication with at least one adjacent reaction zone.

54. (Previously presented) The reactor according to claim 53 wherein the reaction vessel has an internal diameter Dr and each of said reaction zones has a characteristic size Ds, and further wherein Ds is less than Dr.

55. (Currently amended) The reactor according to claim ~~49~~ 48 wherein the internal structures are parallel so as to create parallel reaction zones within the reaction vessel.

56. (Currently amended) The reactor according to claim 49 48 wherein the structures are arranged in various patterns to create repeating reaction zones within the reaction vessel.

57. (Previously presented) The reactor according to claim 43 wherein the internal structures are part of a cooling coil, said coil comprising a continuous set of vertical tubes connected by a connection means.

58. (Previously presented) The reactor according to claim 19 wherein the internal structures are part of one or more coils, said coil comprising a continuous set of vertical components connected by a connection means.

59. (Canceled)

60. (Previously presented) The reactor according to claim 19 wherein the internal structures comprise an area of about 15% to about 25% of the cross-sectional area of the reaction vessel.

61. (Previously presented) The reactor according to claim 19 wherein the internal structures comprise an area of about 15% to about 20% of the cross-sectional area of the reaction vessel.

62. (Previously presented) The reactor according to claim 19 wherein the internal structures comprise a non-uniform configuration.

63. (Previously presented) The reactor according to claim 62 wherein the non-uniform configuration ranges from, but does not include, fully uniform-equally spaced configurations to completely random configurations.

64. (Previously presented) The reactor according to claim 19 wherein the internal structures comprise a completely non-uniform configuration at 5% to 20% of the total area of the reaction vessel.

65. (Previously presented) The reactor according to claim 19 wherein the reaction vessel comprises at least 2 distinct circular reaction zones.

66. (Previously presented) The reactor according to claim 19 wherein the reaction vessel comprises at least 4 distinct circular reaction zones.

67. (Previously presented) The reactor according to claim 19 wherein the plurality of internal structures comprises active structures.

68. (Currently amended) The reactor according to claim 19 wherein the gas distributor is suitable for passing a gas flow ~~has~~ having a gas linear velocity of about 12 cm/s to about 50 cm/s.

69. (Currently amended) The reactor according to claim 19 wherein the plurality of internal structures inside the reaction vessel are capable of minimizing liquid axial dispersion to achieve a productivity similar to that obtained from a multitude of reactors with diameter of characteristic size Ds. ~~are arranged such that hydrodynamics in each reaction zone approach the hydrodynamics in a column with a diameter equivalent to the characteristic size Ds of said reaction zone in order to achieve a reactor productivity similar to that achievable with a multitude of smaller diameter reaction zones.~~